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Sent: Monday, July 6, 2015 9:13 AM
To: Misha Gromov
Subject: I m around until wed if you want to talk more about sense making

Your question about entropy is an important one. The second law of thermodynamics tells us that systems go to states of high entropy where events are random and uncorrelated, so that thermal fluctuations appear to be statistically independent. However, if you look under the hood of the second law, you find that what is really going on is that the dynamics that leads you to this high entropy state is actually generating huge amount of correlations between the different parts of the system. In fact, the apparently random and independent fluctuations of the parts reflect large correlations with the other parts of the system. But these correlations are effectively smeared out over the whole system: to reveal the fact that they are not truly independent, one would have to make measurements on all the parts together, and tease out the extensive but subtle correlations between them.

For example, even though the apparent high entropy of a gas of molecules reflects all the correlations that are generated by the collisions of molecules over time, if one looks at just two molecules in the gas, their motions will be statistically independent to a high degree of accuracy.

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please note

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